

# 4

## **Sprint 1 - Endurance Design Document**

**November 10, 2021**

Use this Requirements Specification template to document the requirements for your product or service, including priority and approval (Must do).

This document will also serve as a System Design Document (How to) and will include sections detailing system flow, algorithms, staffing plan, software/hardware, and Test Plan

This document contains instructions and examples which are for the benefit of the person writing the document and should be removed before the document is finalized.

To regenerate the TOC, select all (CTL-A) and press F9.

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## 1. Executive Summary

### 1.1 Project Overview

This project is the first of three sprints using a Sphero Robot. The project is meant for the professor of the class and presentation to the entire class.

### 1.2 Purpose and Scope of this Specification

#### In scope

This project addresses requirements related to Sprint 1 Endurance assignment

#### Out of Scope

Sprint 2 and Sprint 3 are out of scope and will be completed at a later time.

## 2. Product/Service Description

The project must meet the requirements laid out in the directions for the Endurance Sprint

### 2.1 Product Context

The project is independent of all other projects besides the other Sprints which will be completed later and compiled with this Sprint to form a presentation.

### 2.2 User Characteristics

- Professor: Grades the project based on requirements and specifications
- Students: Will observe project when it is presented in December alongside Sprints 2 and 3

### 2.3 Assumptions

Assumed that the person using the block code for the robot actually has a robot that can run the code and Sphero Edu software on their computer to link with the

### 2.4 Constraints

- Must work with block code in Sphero Edu app

### 2.5 Dependencies

List dependencies that affect the requirements. Examples:

- Project assignment requirement list on eCampus

## 3. Requirements

Req#	Requirement	Comments	Priority	Date Rvwd
ENDUR_01	Prepare Robot on Starting Line	Just a matter of placing the robot at the starting point each run.	3	10/29
ENDUR_02	Configure Aim Position	This is crucial, the robot must be facing the correct direction to start, or else the whole track will be missed.	1	10/29
ENDUR_03	Move on First Leg Then Stop		1	10/29
ENDUR_04	Turn to Second Leg		1	10/29

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ENDUR_05	Move on Second Leg Then Stop	Once basic movement is completed, the other parts become copy and paste with minor variation	1	10/29
ENDUR_06	Turn to Third Leg		1	10/29
ENDUR_07	Move on Third Leg Then Stop		1	10/29
ENDUR_08	Turn to Fourth Leg		1	10/29
ENDUR_09	Move on Fourth Leg Then Stop		1	10/29
ENDUR_10	Configure Lighting and Sounds	Lighting and sounds can be completed after the main motions have been completed, much easier to implement those compared to the motion	1	10/29
ENDUR_11	Optimize and Review Code	Check over the code to find better ways of doing things and clean it up to be clear as to what everything is doing	2	10/29

## **3.1 Security**

### **3.1.1 Protection**

- Our laptops have passwords
- One person keeps the robot at all times

### **3.1.2 Authorization and Authentication**

- Security features were not required or needed for this assignment

## **3.2 Portability**

- Not a requirement, none of the code written is meant to be used anywhere besides in the classroom

## **4. Requirements Confirmation/Stakeholder sign-off**

Include documentation of the approval or confirmation of the requirements here. For example:

Meeting Date	Attendees (name and role)	Comments
10/29/21	Vincent, Mason, Zak	confirmed all requirements

## **5. System Design**

This section will provide all details concerning the technical design, staffing, coding, and testing the system

### **5.1 Algorithm**

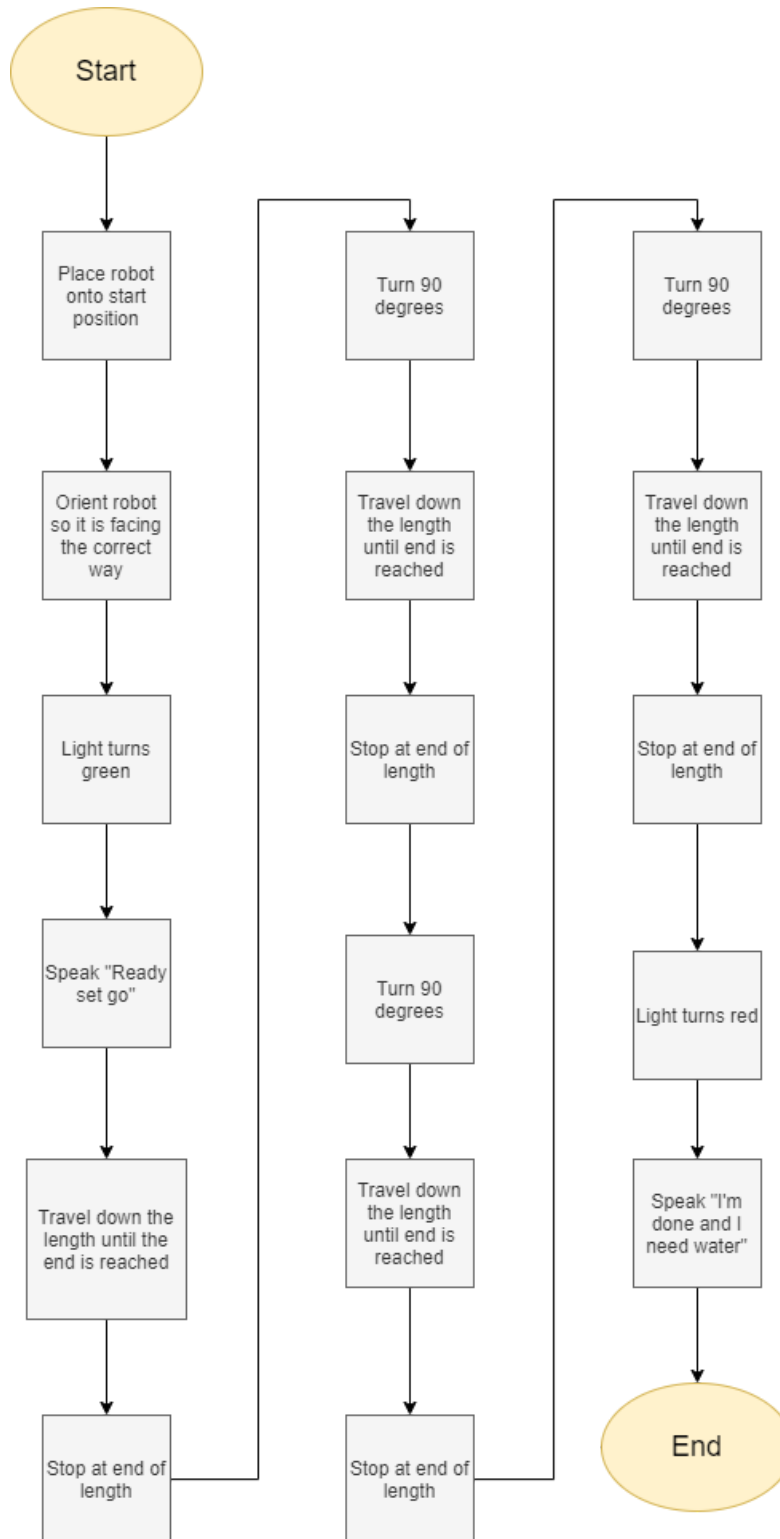
1. START
2. Place the robot on the track.
3. Orient robot in forward direction.
4. Set light to turn green.

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5. Robot says 'Ready set go'.
6. Robot moves forward to the end of the length.
7. STOP at the end of the length.
8. Robot turns right at 90 degrees.
9. Robot moves forward to the end of the length.
10. STOP at the end of the length.
11. Robot turns right at 90 degrees
12. Robot moves forward to the end of the length.
13. STOP at the end of the length.
14. Robot moves forward to the end of the length.
15. Robot turns right at 90 degrees
16. STOP at the end of the length.
17. Light turns red.
18. Robot says 'I'm done and I need water!'
19. END.

## 5.2 System Flow

Develop a flowchart (and show here) that accurately depicts how your software application will act to fulfill the algorithm



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### 5.3 Software

Describe software languages/platforms/api's used to develop and deploy this application

- Sphero Edu

### 5.4 Hardware

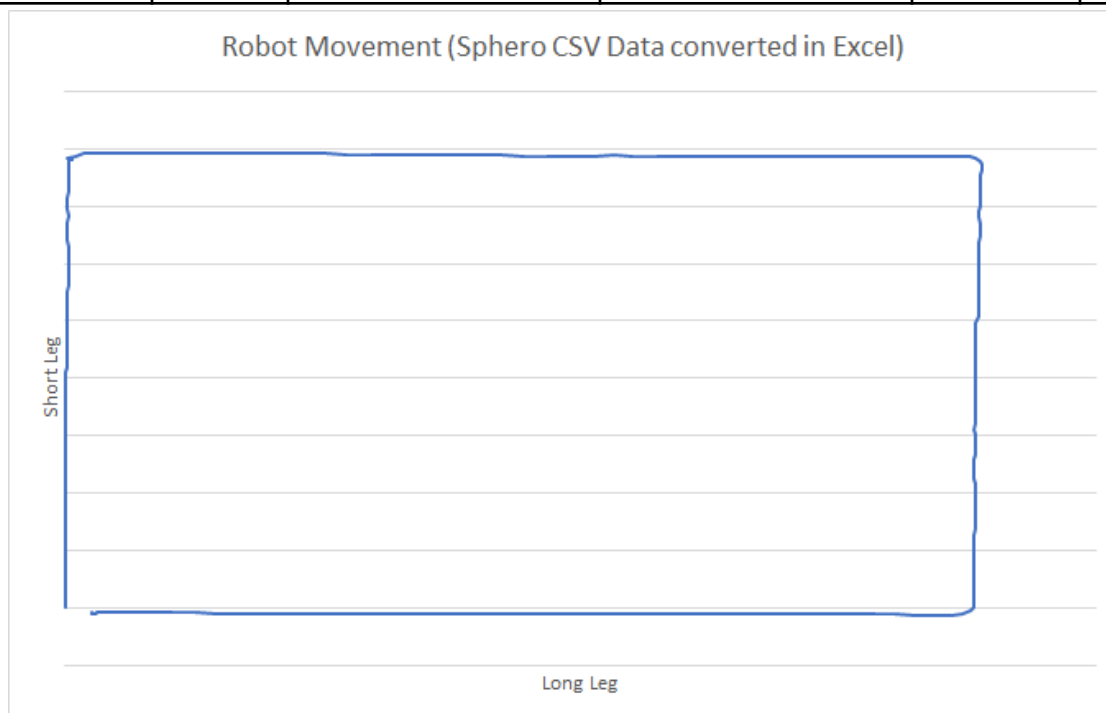
Describe hardware platforms that were used to develop, test and demonstrate this application

- Laptops

### 5.5 Test Plan

Include a test plan showing all unit tests performed for this application, Include test rational, test date, staff member, pass/fail status

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Testing block code	10/29	Move in a rectangle	Moved in rectangle, but did not follow the path exactly	Zak	Pass
First leg travel test	10/29	Move in a straight line, stop at the end of the tape	Exceeded the given line	Vincent	Fail
First leg travel test	11/3	Move in a straight line, stop at the end of the tape	Short of the given line	Vincent	Fail
First leg travel test	11/3	Move in a straight line, stop at the end of the tape	Exceeded the given line	Vincent	Fail
Full course travel test	11/9	Try to run the full course within 3 inches of the tape lines at max	Met expected result and finished near starting point	Vincent	Pass

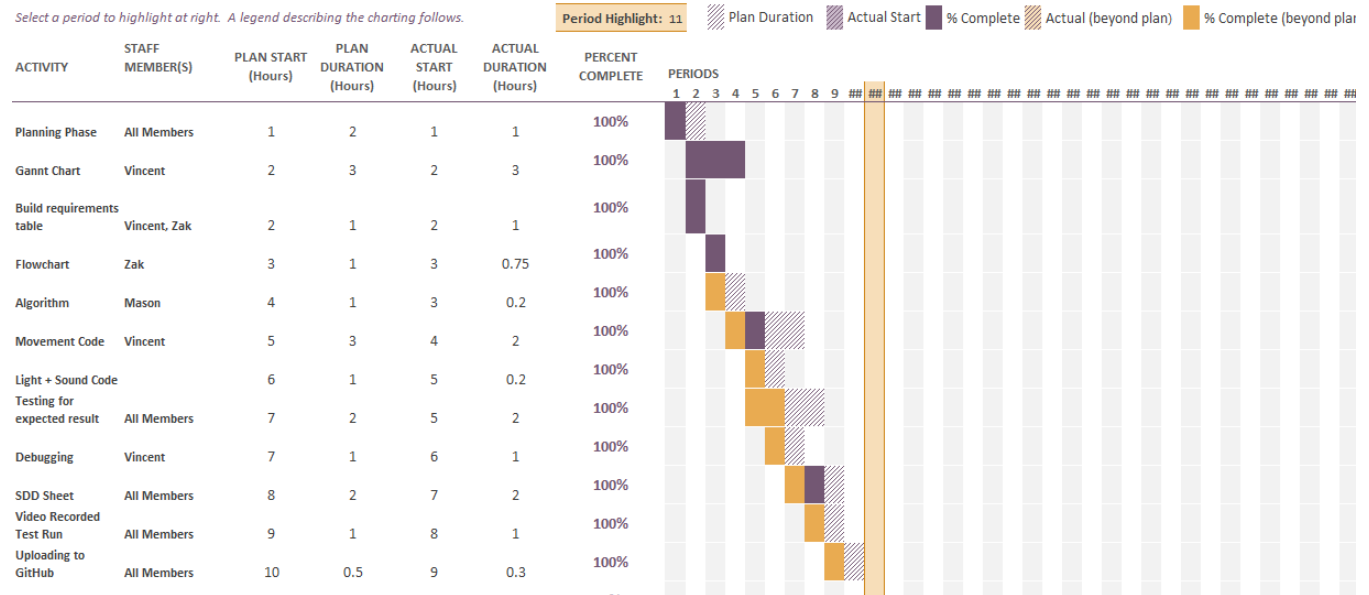


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### 5.6 Task List/Gantt Chart

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Select a period to highlight at right. A legend describing the charting follows.



### 5.7 Staffing Plan

Insert a chart/table that depicts the roles and responsibilities of each team member that worked on this project

Name	Role	Responsibility	Reports To
Zak	Group Member	Flowchart	Other Members
Mason	Group Member	Algorithm	Other Members
Vincent	Group Member	Block Code	Other Members